Meanings of Fire: A Pathway to Understanding Indonesia's Forest and Peat Fires

Bambang Trihadmojo
Northwestern University

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Abstract

Indonesia's forest and peat fires are of particular concern both nationally and globally. The fires have produced severe damages across sectors (e.g., economy, environment, public health, etc.) and scales (i.e., national to global). Despite the implementation of various efforts to prevent future fires, large-scale fires continue. Research suggests this failure is related to stakeholders' actions toward both the forest and the fires. In this study, I attempt to explain such actions by investigating multiple meanings of fire. Drawing on cultural theory, I hypothesise that the meanings differ over time and are shaped by varying interests, contexts, group memberships, and stakeholders' proximities to fire and conceptions of the fires. I employ Griswold's (1987) cultural analysis and Griswold's (2013) cultural diamond to analyse data generated from secondary sources. Findings suggest that meanings of fire are shaped by political and economic situations, spatial context, perceived utility of the forest, cognitive representation of fires, power, ideology, interest, and practice. Implications for sociological study on the relationship between society, culture and nature as well as good practices are also discussed.

Keyword: Fire, Indonesia, human-nature, forest, peatland

BACKGROUND

Environmental problems entail human conduct in interaction with nature. Human beings tend to consider nature an exploitable realm within which they can appropriate natural resources as factors of economic production and exchange. In recent time, natural resources have been explored, extracted, exploited and organised at a remarkable rate. This form of human-nature interaction has altered the make-up of the global environment. Global environmental change has resulted in pressing environmental challenges – including but not limited to prolonged droughts, prevalent heat waves, more frequent floods, extreme hurricanes, tropical cyclones, ecosystem destruction, ozone depletion and transboundary pollution – that are perilous for public health, economic prospects, water supply and food security (IPCC, 2013; Steg & de Groot, 2019). Multiple initiatives have been pursued to rectify the consequences of such interaction. The initiatives are designed to realise sustainable resource management with particular attention to conserving forests across the tropics (Angelsen et al., 2018; Boedhihartono, 2017; Di Gregorio et al., 2019).

Tropical forests have a vital role in buffering the brunt of global environmental change. The forests act as a giant carbon sink, and well preserved tropical forests can reduce global emission by at least 30% (Busch & Seymour, 2016; Turetsky et al., 2015). Unfortunately, tropical forest conservation efforts have faced a significant challenge from the occurrence of fires (Carmenta, Coudel, & Steward, 2018). Extensive fires have become more frequent and pervasive in tropical forests worldwide (Fernandes et al., 2017; Jolly et al., 2015). Indonesia has been identified as a hotspot of fires activities, a considerable proportion of which has come from within its peat landscape (Gaveau et al., 2015; Ordway, Asner, & Lambin, 2017; Luca Tacconi, 2016; Wijedasa et al., 2017). Due to their severity, frequency and cross-scale impacts, Indonesia's forest and peat fires are of particular concern both nationally and globally.

Forest and peat fires in Indonesia have incurred losses across sectors (e.g., the environment, the economy, public health, local livelihood, etc.) and scales (i.e., local to global) (Carmenta et al., 2017; Trihadmojo et al., n.d.). In 2015, for example, forest and peat fires devastated the country and neighbouring nations (Balch, 2015; World Bank, 2015). About 3 million hectares of Indonesia's tropical forest was burnt – an area larger than the U.S state of Vermont (R. B. Edwards, Falcon, Higgins, & Naylor, 2018). The forest, in fact, has historically been rich in biodiversity and home to many endangered species, such as orangutans, Sumatran elephants, rhinos and tigers (World Bank, 2016). The 2015 mega-fires produced transboundary toxic haze, and exposure to which resulted in tens of thousands of people in Southeast Asia suffering from acute respiratory ailments (Lin, Wijedasa, & Chisholm, 2017). It is further reported that over 100,000 premature deaths occurred in Indonesia, Malaysia and Singapore (Koplitz et al., 2016). The regional economic loss incurred in connection with the fires was ~ 33 billion USD (~ 35 billion USD in today's money) (Al Jazeera, 2015). Burning forest and peat landscapes emitted ~ 1.5 billion tonnes of carbon emission – exceeding the annual daily average of carbon emission produced by the U.S. economy for the same period (Van der Werf, 2015; World Bank, 2016). In terms of these consequences, Meijaard (2015) describes the event as the most significant environmental crime of the 21st century – worse than British Petroleum's Deepwater Horizon oil spill in 2010.

Although the 2015 mega-fires have had profound impacts on regional humanitarian and economic spheres, and the global environment. Indonesia's forest and peat fires were not isolated to a singular event. Devastating fires have recurred in Indonesia's forest and peat landscapes since the 1980s (Dennis, 1999; Jong, 2018; Luca Tacconi, 2016). Research suggests that severe drought, excessive resource use and land clearing by means of fire within Indonesia's forest and peat landscapes have been the primary causes of Indonesia's forest and peat fires (Page & Hooijer, 2016; Singer, 2009). A number of policies and interventions have

been put into practice to address such causes[1] (Dennis, 1999; Marlier et al., 2015; Luca Tacconi, 2003; Wijaya, Minnemeyer, Juliane, Payne, & Chamorro, 2016). Yet, Indonesia still grapples with recurring forest and peat fires (Fitria, 2019; Jong, 2018). While one may question the effectiveness of such policies and interventions, recent studies show stakeholders' actions toward both the forest and the fires are paramount for causing the fires (R. B. Edwards, 2018; R. B. Edwards et al., 2018).

Indonesia has largely been reliant on forest resources for its economic growth and development. The country's tropical forest and peat landscapes have experienced rapid and massive land-use change as the Indonesian central government has made way for development projects (e.g., transmigration and district expansion), and logging activities and cash crop plantations (e.g., oil palm, pulp-paper, rubber) (R. B. Edwards et al., 2018; Fearnside, 1997; Gellert, 1998; Page & Hooijer, 2016). Along the same vein, international donors (e.g., the World Bank and ADB: Asian Development Bank) have provided the government with both technical and financial aid (Adhiati & Bobsien, 2001; Sahide, Maryudi, Supratman, & Giessen, 2016).

Relatedly, local bureaucrats have extended the government's action in attempts to generate local revenue and maintain their contribution to the national economy (Harwell, 2000; Lovett, Sagala, & Sasongko, 2018; Ribot, Agrawal, & Larson, 2006). Extravagant use of natural resources has opened the forest canopy and drained a large proportion of peatland (Cochrane, 2003; Page & Hooijer, 2016). Fragmented forest and damaged peat landscapes are highly flammable and can become a natural precursor for large-scale fires (Murdiyarso & Adiningsih, 2007; Sloan, Locatelli, Wooster, & Gaveau, 2017).

[1] The policies and initiatives include the establishment of an early warning system, fire suppression and prevention, the issuance of a strict ban on clearing land through burning, a moratorium on new licenses to convert forested and peatland landscapes into commercial plantations, an attempt to restore degraded peatland landscape and implementation of community-based fire prevention.

Furthermore, agribusiness companies, smallholders and small-scale farmers have cleared land by means of *fire* in often fragmented and degraded landscapes (Carmenta et al., 2017). Perceived economic benefits of clearing land through burning (i.e., it is cheap, easy and effective) have driven agribusiness companies and smallholders to use fire as a means for preparing, developing and maintaining agricultural and plantation lands (Purnomo et al., 2017; Simorangkir, 2007; Luca Tacconi, 2016). Relatedly, small-scale farmers have cleared land by means of fire – a farming method that is referred to as slash-and-burn – to prepare agricultural land, generate natural nutrients, enhance soil fertility, eliminate destructive weeds and increase production yield (Fox, 2000; Henley, 2011; Kleinman, Pimentel, & Bryant, 1995; Padoch et al., 2007). In the same line, environmental activists have advocated for the practice of slash-and-burn by small-scale farmers and consider commercial land clearing by means of fire environmentally destructive (Jong, 2017; WWF, 2006). While exuberant use of natural resources, seismic land-use change and land clearing by means of fire within Indonesia's forest and peat landscapes have been responsible for the occurrence of large-scale fires (Cochrane, 2003; Luca Tacconi, 2016; Varkkey, 2013), research shows that stakeholders' actions concerning the fires appear to have perpetuated the fires' recurrence (McCarthy, 2013; Thung, 2018; Trihadmojo et al., n.d.; Wijedasa et al., 2017).

Although the Indonesian central government and international donors have appeared to work together in fighting the current and preventing future fire events (Dennis, 1999; UN Environment, 2018), it is reported that these stakeholders continued to lavishly exploit forest resources (Dewi, Heroepoetri, Leonard, & Gultom, 2018; Gellert, 1998). On the one hand, local bureaucrats have been inconsistent in implementing national policies concerning forest and peat fires (Ansori, 2018; Thung, 2018). On the other hand, small-scale farmers have shown resistance against policy implementation (Thung, 2018).

While agribusiness companies have begun to develop community-based intervention as an attempt to prevent future fires (Chamorro, Minnemeyer, & Sargent, 2017; The Jakarta Post, 2017), it is reported that this stakeholder still plans to convert forest and peat landscapes into cash crop plantations (Fernandez, 2017). Environmental activists and small-scale farmers have accused both company interventions and government policies of only perpetuating a more significant burden on farmers' subsistence, cultural practice and food security[2] (RCA, 2016; Rogers, 2016; Thung, 2018). For these reasons, I suggest that that failure in preventing Indonesia's forest and peat fires is rooted in stakeholders'[3] actions toward both the forest and the fires.

I argue that stakeholders' actions do not come out of thin air. Human actions are often grounded in meaning. Griswold (2013) describes meaning as a system that regulates humans' interaction with one another and their environment. Geertz (1973) argues meaning to be governing, orienting and organising individuals' actions as they navigate the world. Swidler (2001) suggests that meaning enables people to organise their action in any given situation.

Just like actions, meaning does not float freely without an anchor. It is attached to a specific cultural object which is "shared significance embodied in form" (Griswold, 2013:11). This means that the object can take form in anything so long as people can access, see, experience and think about it. In light of the human-nature relation, Eder (1996) suggests that meaning attached to a particular cultural object in the world affects how people interact with nature. It is thus reasonable to situate fire as a cultural object, and understanding its meaning may explicate stakeholders' actions in the realm of Indonesia's forest and peat fires.

Despite the crucialness of meaning for human actions, little precise research has been conducted to investigate the meanings of *fire*. Studies on Indonesia's forest and peat fires have

[2] Including from direct communication with Made Ali, a coordinator of Jikalahari – a Riau based environmental organisation

[3] In this study, the stakeholders consist of the Indonesian central government, international donors, local bureaucrats, environmental activists, agribusiness companies, smallholders and small-scale farmers.

primarily examined their biophysical, economic and social consequences and causes.[4] In assessing the causes, this body of research, however, tends to revolve around a climate variable (i.e., El Nino years) and land clearing by means of fire. Despite this limitation, several studies indicate that stakeholders might assign different meanings to fire.

According to Harwell (2000), the Indonesian central government and international donors consider fire problematic for Indonesia's development agenda. Clearing land by means of fire is deemed backwards and against modernity. In response, the government has prohibited the slash-and-burn practice of small-scale farmers and has developed the palm oil sector. Even though the expansion of palm oil plantation is linked to the occurrence of Indonesia's forest and peat fires, international donors (e.g., the World Bank and IMF: International Monetary Fund) provide the government with necessary aid. Harwell (2000) also notes that environmental activists consider fire essential for small-scale farmers' subsistence and subsequently challenge the government's ban on slash-and-burn. Relatedly, Trihadmojo (2016) illustrates that small-scale farmers consider fire important for their agricultural tradition and see clearing land through burning as a way to perform that tradition.

Carmenta, Zabala, Daeli and Phelps (2017) suggest that meanings of fire span a range of concerns, from political, economic and public health burdens to economic benefits. They note that stakeholders who associate fire with burdens tend to support fire prevention initiatives. Conversely, stakeholders who associate fire with benefits tend to oppose the initiatives. Similarly, Purnomo et al. (2017) show that stakeholders who deem fire economically beneficial form a social network through which they can maximise the utility of clearing land by means of fire, even in a degraded landscape.

4 See Bowman et al., 2009; Cattau, Marlier, & DeFries, 2016; Fernandes et al., 2017; Gaveau et al., 2014; Groot, Field, Brady, Roswintiarti, & Mohamad, 2007; Pribadi & Kurata, 2017; Sheldon & Sankaran, 2017; Sizer et al., 2014; Sloan et al., 2017; Tacconi, 2003, for a review

More recently, Thung (2018) has described local bureaucrats as seeing fire as a tool they can use to maintain their relationship with both the Indonesian central government and small-scale farmers. Similarly, Ansori (2018) notes that the bureaucrats consider fire imperative for their social relations with the farmers. According to these authors, such meaning of fire can compromise the implementation of fire prevention policy by the bureaucrats.

While this body of research manages to capture meanings of fire, the authors appear to treat the meanings as given. They appear to downplay the process through which such meanings may come into being. In fact, the meaning of a cultural object is culturally constituted and shaped by ideas, interests, values, ideology, practices and social contexts (Sewell, 1992; Wuthnow, 1989). Several studies related to human-nature interaction appear to corroborate this contention, although they do not discuss fire.

Norgaard (2013) suggests that the meaning of global warming within the community of Bygdaby, Norway, is a result of the interplay of the Norwegian media, government and activists. The media broadcasts unusual weather events brought about by the warming while both the government and the activists amplify the threat of global warming and encourage collective actions to address it. At the same time, however, the government has decided to increase its oil production, and "[i]ncreasing consumption and wealth from the North Sea oil make Norway one of the larger per capita contributors to the problem of global warming" (p. 177). Exposure to the perils of warming and information about the government's oil development lead the communities to associate global warming with fear and guilt.

Rikoon (2013) describes how the interplay among National Park Service (NPS) staff, members of the Missouri Wild Horse League (MWHL) and local residents of Ozark National Scenic Riverways shape meanings of wild horses in Ozark National Park. He notes that the meanings are influenced by these stakeholders' interaction with the national park's landscape. The NPS staff view the national park as a pristine natural landscape that needs to be conserved

and consider the horses feral. This meaning motivates the staff to remove the horses from the national park.

Conversely, members of MWHL believe that Ozark National Park is a social and cultural landscape, and the horses represent the self-identity of local residents. Along this line, local residents consider the horses an important part of their tradition and personal experience. These meanings motivate both the MWHL and local residents to respond with stiff resistance and public protests to the staff's attempts to remove the horses.

Taken together, these examples illustrate how meaning of a cultural object does not emerge in isolation. The meaning-making process takes place in a public domain where people who produce and receive meanings interact (Griswold 2013). Griswold (2013) suggests that both the creators and receivers actively engage in the process by which such engagement may result in multiple meanings of a given cultural object. Such a process remains underexplored within the literature of Indonesia's forest and peat fires. This limitation is unfortunate given that information on the process could offer a pathway to understand the recurrence of Indonesia's forest and peat fires. In a broader sense, such information may elucidate why human interaction with nature at a local level may lead to the recurrence of global environmental catastrophe. This study, therefore, is designed to investigate the emergence of meanings of fire within seven critical stakeholders: the Indonesian central government, international donors, local bureaucrats, environmental activists, agribusiness companies, smallholders and small-scale farmers. In doing so, this study employs Griswold's (1987) cultural analysis by means of Griswold's (2013) cultural diamond. This study is guided by the question: How do different meanings of *fire* emerge in the realm of Indonesia's forest and peat fires?

Theoretical Framework

Meaning of a cultural object is often derived from culture. In the words of Geertz (1973), culture is a web of meanings within which people make sense of their actions. Geertz (2002) further notes that culture serves as a frame of mind that enables individuals to produce particular meanings of a cultural object the meanings of which then guide their behaviour. Likewise, Griswold (2013) writes that culture is the bearer of meaning. In the same vein, Swidler (1986) argues that culture provides people with vehicles of meaning that they can use in varying configurations to make a cultural object meaningful. These vehicles of meaning can take form in cultural materials, such as values, beliefs, emotions, narratives, knowledge, rituals and norms (Jepperson & Swidler, 1994). According to Weber (1946, 1998), culture is a complex set of tracks on which meaning operates and determines a pathway for action. Relatedly, Griswold (1987) notes that the meaning of a cultural object is intended to have some force and is directed toward a particular objective. This could mean that people's interest may affect how they use cultural materials when creating the meaning. Self-interest is indeed part of the meaning-making process. According to Weber (1998), people often rely on a rationalisation calculation when determining the materials with which to create a meaning of a cultural object. Thus, culture enables people to draw a meaning from a cultural object, and the construction of such a meaning entails people's interest.

Additionally, meaning does not happen in a vacuum. An interactive engagement between people and a cultural object shapes the meaning in a given context as Griswold (2013:14) describes:

> "Other people besides their creators experience cultural objects, of course. If a poet sings her odes in the wilderness with no one to hear or record, if a hermit invents a revolutionary new theology but keeps it to himself, if a radio program is broadcast but a technical malfunction prevents anyone from hearing it, these present potential but not

> actual cultural objects. Only when such objects become public, when they enter the circuit of human discourse, do they enter the culture and become cultural objects. Therefore, all cultural object must have people who receive them, people who hear, read, understand, think about, enact, participate in, and remember them. We might call these people the object's audience, although that term is a bit misleading; the people who actually experience the object may differ from the intended or original audience, and far from being a passive audience, cultural receiver are active meaning makers."

She continues:

> "Both cultural objects and the people who create and receive them are not floating freely but anchored in a particular context. We can call this the social world, by which we mean the economic, political social, and cultural patterns and exigencies that occur at any particular point in time" (p. 14).

Another essential element of cultural theory centres on frame. Bolman and Deal (2017) suggest that frame is a map that serves as a tool to aid people in navigating their place in the world. Frame also represents different point of views through which the world is evaluated. Goffman (1974) argues that frame provides context that permits people to use their knowledge and experience to build a foundation upon which they make sense of the problems they face. Laws and Rein (2003) describes frame as the representation of knowledge with which people make sense of their world. However, frame is not stable. Lakoff (2010) describes frame as a continuously changing construct that people build over time – suggesting that people would only employ knowledge in situations that are familiar to them. Along the same line, Swidler (2001) writes that a person needs to adapt his/her frame to unexpected difficulties before jumping from one frame to another.

Taken together, an interaction linking culture, a cultural object, a creator, a receiver and the social world can determine meaning. Culture permits both the creator and receiver to utilise readily available materials to create, and possibly recreate, meaning(s) of a cultural object. This interplay happens as they actively interact with such an object in their social world. Further, the way they see the world may contribute to how they use the materials and hence influence the meaning. To put such an interaction into practice, I consult to Griswold's (2013) cultural diamond which presents the interaction as in figure 1.

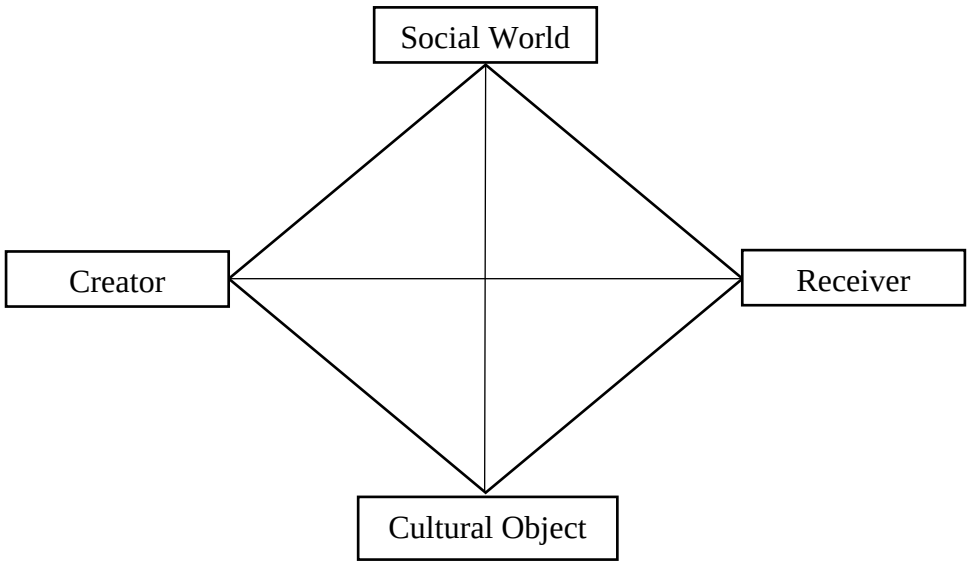

Figure 1. The Cultural Diamond (Griswold, 2013:15).

Griswold's (2013) cultural diamond is particularly useful for building a fuller understanding of how meaning of a cultural object emerges in a particular historical and social context. The six lines are helpful for capturing how the four elements interact to yield meaning(s). Additionally, Griswold (2013) notes that the utility of her cultural diamond is contingent on a specific context. By this she means that the diamond can only be used to explicate the emergence of meaning in a certain social world. Thus, the meaning can either remain the same or change as the social world evolves. In this light, I situate fire as cultural object and Indonesia's forest and peat fires as a social world; further, I locate stakeholders as

both creator and receiver. Since extensive fires have recurred multiple times in Indonesia, I need to generate several cultural diamonds in my attempt to explain the emergence of the meanings of fire.

While Griswold's (2013) cultural diamond helps me to locate and contextualise interactions through which meanings of fire may emerge, I employ Griswold's (1987) cultural analysis to further explain the interaction. According to this method, meaning of a cultural object is defined by a creator's intention and a receiver's reaction across space and time. To understand this dimension, the analysis introduces two concepts: comprehension and explanation (see Griswold, 1987:17-26, for a review). Comprehension can be understood as a heuristic mode to specify and explicate the meaning from the accounts of the creator and receiver. Explanation refers to researchers' interpretation and understanding of the connection between a cultural object and a wider context within which the creator and receiver interact with the object. In explaining the connection, Griswold (1987) notes that a researcher needs to focus on:

1) contextual social, political and economic situations within which both the creator and receiver are located
2) social category or group to which the creator and receiver belong
3) proximate and remote experiences of a cultural object.

I focus on these features in my cultural analysis of the emergence of meanings of fire among stakeholders in the realm of Indonesia's forest and peat fires. To answer my research question, I develop the hypothesis: Meanings of fire among stakeholders differ over time and are shaped by varying interests, contexts, group memberships, proximities with fire and conceptions of Indonesia's forest and peat fires.

METHOD

Data

In this study, I generate data from previous studies on Indonesia's forest and peat fires by anthropologists, and political, environmental and remote sensing scientists (e.g., Ansori, 2018; Edwards et al., 2018; Gellert, 1998; Malingreau, Stephens, & Fellows, 1985; McCarthy, 2013; Page & Hooijer, 2016; Suyanto, Applegate, Permana, Khususiyah, & Kurniawan, 2004; Thung, 2018; Vayda, 2010). I also acquire data from reports produced by international organisations (e.g., CIFOR: Center for International Forestry Research, WRI: World Resource Institute, EU: European Union) , including international donors (e.g., the World Bank, ADB: the Asian Development Bank, GTZ: German Technical Cooperation Agency). In addition, I review news outlets (e.g., The Guardian, The Jakarta Post, The Mongabay), a doctoral dissertation (i.e., Singer, 2009), three masters theses (i.e., Barr, 1999; Thung, 2016; Trihadmojo, 2016) and one undergraduate thesis (Dixon, 2016). My using secondary data reflects a significant constraint that limits my capacity to conduct fieldwork. However, there is also good reason to use existing studies and reports. Griswold (1987) writes that a researcher can use information from expert specialists when studying a cultural object, although the researcher should not treat the experts' information as final (see p. 24 for a review). The authors I include appear to specialists on Indonesia's forest and peat fires to the extent that they have conducted lengthy studies on the issue. It is important to note, however, that my attempt to explain the emergence of meanings of fire depends on the authors' interpretations and my own understanding of their interpretations.

Procedure

I begin with a review of articles on Indonesia's forest and peat fires[5] which I acquire from database of CIFOR's library using key words: *forest fires* and *Indonesia*. I then search more articles and reports through SCOPUS, Environment Abstract, the World Bank, FAO[6] and WRI databases, and google scholar. In doing so, I use the same key words as that I use in CIFOR's database. I attend to the researchers' interpretations of stakeholders' perspectives on fire and Indonesia's forest and peat fires, scrutinising the similarities and differences of meanings of fire within such interpretations. I then develop eight provisional genres: *wrath*, *disturbance*, *primitiveness*, *production*, *tradition*, *relational token*, *social justice* and *weapon of the weak*. Griswold (1987:17) notes that "genre is key to analytical comprehension." It is a categorisation of differences and similarities pertaining to a cultural object. Hence, it enables a researcher to interpret and classify meanings of a cultural object.

My next step is to explain concepts in the authors' interpretations. I discern temporal social, political and economic situations within which the authors located stakeholders. I then establish the connections between these situations and stakeholders' category by identifying background situations where the authors studied Indonesia's forest and peat fires, and I capture the spatial locations from which the stakeholders might have experienced and interacted with fire. Up to this point, this procedure may appear to mimic critical discourse analysis which allows a researcher to explain complex social phenomena through textual data (see Wodak & Meyer, 2009, for a review). However, I employ Griswold's (1987) cultural analysis to investigate meaning-making process of a cultural object (i.e., fire) through the lenses of cultural sociology.

[5] These articles include Applegate, Chokkalingam and Suyanto (2001), Carmenta et al. (2017), Dennis (1999), Purnomo et al. (2018) and Tacconi (2003; 2016).
[6] Food and Agriculture Organization of the United Nations.

I then utilise a cultural diamond when explaining the meanings of fire. It highlights three major episodes of forest and peat fires in Indonesia. These are The Great Fires of Borneo of 1982/83, The Great Indonesian Fires of 1997/98 and The 2015 mega-fires. The logic behind my decision to focus on these episodes lies on their magnitude. The Great Fires of Borneo of 1982/83 created the initial hallmark of the size and severity of forest and peat fires (Dennis, 1999). The Great Indonesian Fires had significant national and regional social, political and economic consequences (Luca Tacconi, 2003). The 2015 mega-fires resulted in humanitarian and environmental crises (Balch, 2015).

FINDINGS

My analysis suggests that the emergence of multiple meanings of fire is nested in various elements which I categorise in two general types: *enabling* and *immediate*. The enabling elements encompass the national political situation, spatial context, and global, regional and national economic situations. The immediate elements consist of the perceived utility of the Indonesian forest, cognitive representations of Indonesia's forest and peat fires, power, interest, ideology and practice. This categorisation is derived from the patterns I perceive to link the emergence of diverse meanings of fire among the stakeholders.

The national political situation is the temporal political atmosphere in Indonesia that enables and restricts the stakeholders' capacity and ability to create meaning of fire. Spatial context is the temporal geographical location from which the stakeholders interact with fire. Global, regional and national economic situations range from global demand for forest products, to economic influx in regional Asia, to domestic economic stability. Perceived utility of the Indonesian forest refers to stakeholders' mental model of the forest, from source of monetary income to life support system. Cognitive representation of Indonesia's forest and peat fires is defined as stakeholders' framing of the fires. Power refers to stakeholders'

privileged access to and control over social resources (e.g., position, wealth, means of communication, etc.) that influence their ability to create and recreate meanings of fire. Interest stems from stakeholders' own interest. Ideology refers to stakeholders' dominant ideas over time. Practice means stakeholders' habitual actions concerning the Indonesian forest.

The enabling and immediate elements appear to be related, and their relationship permits the emergence of multiple meanings of fire. While the data do not permit inference of any causal relationship between the elements, one element may influence another. The relationship of these elements is presented in figure 2.

Detailed findings of my analysis are presented according to the three episodes of Indonesia's forest and peat fires. To further understand the process behind the emergence of different meanings of fire, I locate the episodes in three cultural diamonds. In general, the interplay between the national political situation and the economic condition at global, regional and national levels creates a condition that influences the power relation among the stakeholders. This condition permits a certain stakeholder to create a particular meaning of fire and to receive or recreate the meaning. In other words, the condition somewhat defines which stakeholder can become the creator or receiver. Moreover, the interplay of stakeholders' power, ideology, interest, practice, perceived utility of Indonesian forest and cognitive representation of Indonesia' forest and peat fires within a condition appears to determine the emergence of different meanings of fire. It is worth underlining that some of these elements appear to keep changing (e.g., political and economic situations, power) or remain constant (e.g., spatial context and perceived utility of Indonesian forest) throughout the three episodes.

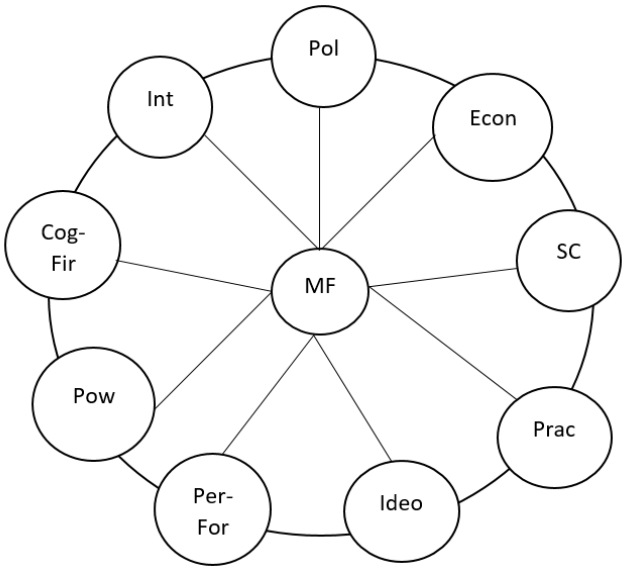

Figure 2. The relationship of meanings of *fire*, enabling and immediate elements.[7]

Element	**Source**
National political situation	Aiken, 2004; Barr, 1999; Edwards et al., 2018; Edwards & Heiduk, 2015; Gellert, 1998; MacAndrews, 1978; McCarthy, 2013; Potter & Lee, 1999; Singer, 2009; Purnomo et al., 2018
Global, regional and national economic situations	Dewi et al., 2018; Dixon, 2016; Potter & Lee, 1999; Singer, 2009; Susanti & Maryudi, 2016; Varkkey, 2013
Spatial context	Dennis, 1999; Gonner, 1999; Purnomo et al., 2017; Suyanto et al., 2004; Tacconi, Moore, & Kaimowitz, 2007; Luca Tacconi & Ruchiat, 2006; Ansori, 2018; Thung, 2016, 2018
Practice	McCarthy & Cramb, 2009; Simorangkir, 2007; Singer, 2009; Varkkey, 2012; World Bank, 1986, 1989, 2018; Boehm & Junaid, 2015; Vayda & Sahur, 1984
Ideology	Barr, 1999, 2006; Gellert, 1998; Harwell, 2000; Singer, 2009; Siscawati, 1998
Perceived utility of Indonesian forest	Barr, 1999; Dixon, 2016; Leonald & Rowland, 2016; Rival & Levang, 2014; Singer, 2009; Tsujino, Yumoto, Kitamura, Djamaluddin, & Darnaedi, 2016**;** Malingreau et al., 1985
Power	Gellert, 1998; Harwell, 2000; McCarthy, 2013; Purnomo et al., 2018; Singer, 2009
Cognitive representation of Indonesia's forest and peat fires	Aiken, 2004; Dennis, 1999; Gellert, 1998; Hail, 1985; Harwell, 2000; Luca Tacconi, 2003; Thung, 2018

[7] MF= Meanings of fire; Pol= National Political Situation; Econ= National, Regional and Global Economic Situations; SC= Spatial Context; Prac= Practice; Ideo= Ideology; Per-For= Perceived Utility of Indonesian Forest; Pow= Power; Cog-Fir= Cognitive Representation of Indonesia's Forest and Peat Fires; Int= Interest.

Interest	Barr, 1999; Dennis, 1999; Harwell, 2000; Potter & Lee, 1999; Purnomo et al., 2017; Singer, 2009; Purnomo et al., 2018

Table 1. Example of data sources from which the elements were synthesised

The Great Fires of Borneo

Between 1982 and 1983, The Great Fires of Borneo wreaked havoc on a large part of Indonesia. An estimate suggests that the fires damaged ~ 3.5 million hectares of Indonesia's forest and peatland (Lennertz & Panzer, 1983). The fires were concentrated on Borneo island, specifically in East Kalimantan's forest and peat landscapes that had been severely degraded by excessive logging activities (Dennis, 1999). The fires produced a thick and poisonous haze that engulfed Indonesia and Singapore (Aiken, 2004). Tangible economic loss from damaged timber forest was ~ 8 billion USD (~ 20 billion USD in today's currency) (Schindele, Thoma, & Panzer, 1989). It is reported that the logging activities, transmigration – a government sponsored resettlement programme – and clearing land by means of *fire* were responsible for the fires (Dennis, 1999; Gellert, 1998).

Extensive logging activities opened a forest canopy and left a large amount of combustible debris on the forest floor (Aiken, 2004). The transmigration programme led to a massive conversion of forested landscape into human settlements, often involving draining a large proportion of peatland (Fearnside, 1997; Pramono, 1991). Heavily disturbed forest, drained peatland, and a prolonged drought in combination with land clearing through burning by transmigrants,[8] small-scale farmers and loggers resulted in widespread raging fires (Aiken, 2004; Dennis, 1999; Lennertz & Panzer, 1983).

In the wake of The Great Fires of Borneo, I find that stakeholders might have associated fire with *wrath*, *production* and *tradition*. The emergence of these meanings appear to be

[8] Transmigrants are participants of the transmigration programme who move within Indonesia. Thus, they are neither emigrants nor immigrants.

shaped by the rise of Indonesia's dictatorship regime (i.e., New Order), growing global demand for tropical hardwood while its supply was declining, stakeholders' interests over forest resources, spatial locations, perceived utility of Indonesian forest, cognitive representation of The Great Fires of Borneo, and ideology. These elements also appear to determine the creator and receiver of the meanings. The rise of the New Order regime enabled the Indonesian central government to be the main creator of the meanings of fire while it made international donors, local bureaucrats, agribusiness companies, smallholders and small-scale farmers the receivers. Nonetheless, the meanings were recreated by the companies, smallholders and farmers. To further understand the emergence of the meanings, I develop a cultural diamond of The Great Fires of Borneo (see figure 3).

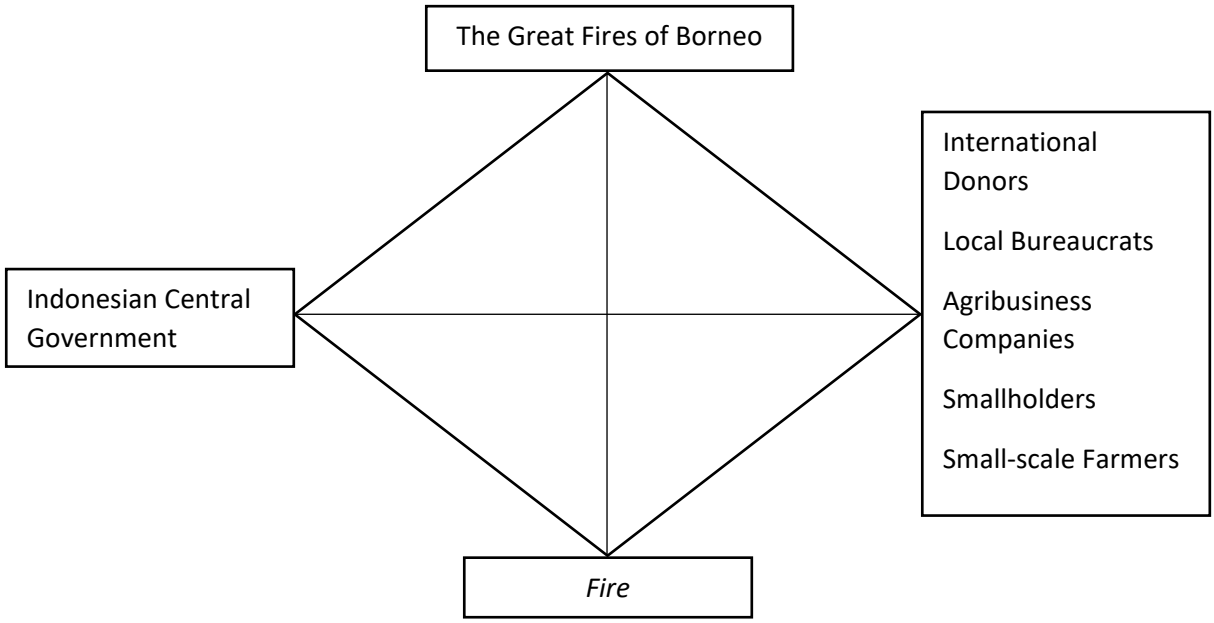

Figure 3. Cultural diamond of The Great Fires of Borneo.

Wrath

The Great Fires of Borneo occurred during the New Order regime, a period when the Indonesian central government maintained nearly absolute power. This situation appears to

have enabled the government to create *wrath* and, arguably, to allow international donors, small-holders, local bureaucrats and small-scale farmers to receive and recreate it. It also prevented environmental activists from recreating that meaning, as political dissent was unacceptable and dissidents faced harsh repercussions.

Wrath suggests fire is "naturally" part of the forest ecosystem. The Indonesian central government believed that severe drought in 1982/83 led to the dispersion of fire that became extensive – and hence The Great Fires of Borneo. Further, the interplay of global and regional economic situations, and the government's interest, ideology, practice, cognitive representation of the fires and perceived utility of the forest led it to use its power to assign the meaning *wrath* to fire.

The New Order regime began when General Soeharto became the Indonesian president in 1966 and collapsed when he was forced to step down in 1998. Political "suffering" that preceded this regime had permitted Soeharto to consolidate his power. The rise of the regime coincided with the growing global demand for tropical hardwood, at the same time that its supply was sharply declining (Singer, 2009). The demand was driven primarily by the rapid and significant development of the tropical plywood industry in Japan, Taiwan and South Korea (Barr, 1999; Singer, 2009). Simultaneously, Soeharto needed to channel funds and capital to his military and bureaucratic powerhouse to secure and maintain their loyalty (Singer, 2009).

A combination of the global economic situation and Soeharto's political need somewhat influenced perceptions of forest utility. In 1966, Indonesia had 139.6 million hectares of standing forest which was rich in tropical timber (Tsujino et al., 2016). Believing that the forest could be converted into a money-making machine, the Indonesian central government exercised its political power to claim ownership over the forest by introducing and imposing Basic Forestry Law 5/1967 (Siscawati, 1998). Specifically, Article 5 of the law

precisely states that all forests within the boundaries of the Republic of Indonesia, including natural resources located within the forests, are controlled by the state. The government then utilised the law to facilitate large-scale extraction of tropical timber. The law permitted the government to implement a concession system known as HPH (*Hak Pengusahaan Hutan* or Right to Utilise Forest) which allowed individuals or companies to log the forest for up to 20 years (Singer, 2009). To acquire an HPH license, applicants had to pay various fees to the government: a one-time payment license fee (IHPH: *Iuran Hak Pengusahaan Hutan*), a forest product royalty (IHH: *Iuran Hasil Hutan*), a timber export tax and a regional development royalty (IPEDA: *Iuran Pembangunan Daerah*) (Barr, 1999). The IHH fee was based on the volume and type of timber harvested. The export tax was initially set at10% of FOB (Free on Board) value. IPEDA fee was charged per 100 m^3 of timber harvested. Thus, the concession system enabled the government to generate an income stream from the forest.

Additionally, the central Indonesian government had to deal with development disparities and an uneven distribution of population. While population was highly concentrated in Java, economic development was, for the most part, evident only on the inner islands (MacAndrews, 1978). To address this issue, the government sponsored a resettlement programme known as transmigration. The programme was designed to move millions of Indonesians from the inner islands to the outer islands (Adhiati & Bobsien, 2001).[9] It was also intended to promote development on the outer islands, as transmigrants were provided with a plot of land to generate an income stream (Adhiati & Bobsien, 2001; MacAndrews, 1978). Furthermore, the implementation of the programme required the government to convert a large proportion of forest and peat landscapes into human settlements which often involved the use of fire in the process (Adhiati & Bobsien, 2001).

[9] A term to describe islands apart from Java, Bali and Madura. Inner islands include Sumatera, Kalimantan, Irian Jaya, Maluku and Sulawesi.

Large-scale timber extraction and the transmigration programme appear to have resulted in forest degradation. Between 1966 and 1982, ~ 17 million hectares of Indonesian forest were destroyed (Tsujino et al., 2016). During the same years, the central government earned ~ 11 billion USD (~ 33 billion USD today) from timber export and managed to resettle nearly 2.5 million citizens in the outer islands (Adhiati & Bobsien, 2001; Barr, 1999; MacAndrews, 1978). Furthermore, severe drought brought about by the extreme ENSO event of 1982-1983 underlie the occurrence of extensive fires – The Great Fires of Borneo (Aiken, 2004). The fires were pervasive in logged forest areas and degraded peatlands (Schindele et al., 1989). The government considered the fires nature's doing, caused purely by the anomalous climate year. This cognitive representation of fires – an act of the nature – when connected to the government's interest, power and perceived utility of forest under the national political and global economic situations might be the reasons behind *wrath*. By naturalising fire, the government might deflect its attention from the real causes of the fires (i.e., extravagant use of forest), disavow its responsibility and continue its practice in using forest.

Wrath appears to be echoed by local bureaucrats and international donors. The interplay of national political and economic situations, power, practice, interest, cognitive representation of fires, and perceived utility of forest appear to have influence these stakeholders to share a similar meaning of fire with the government. Concentration of power and the enactment of the Basic Forestry Law 5/1967 shifted local bureaucrats' power over forest resources. Under the Old Order regime, the use and management of forest resources were regulated by Government Regulation 64/1957 on the Transfer of Partial Authority in the Fields of Sea Fishing, Forestry, and Community Rubber Production to Autonomous Regions, Level I[10] (Barr, 2006). This regulation reduced local bureaucrats' power over forest resources, especially at the provincial level. These bureaucrats had been authorised to manage the resources within their

[10] Level I refers to provincial level

administrative boundaries, including to grant the right to extract timber to third parties (Barr, 2006; Singer, 2009). The Basic Forestry Law thus revoked their rights and disrupted their ongoing, if not prior, practice in using forest resources.

The change in local bureaucrats' power amidst Indonesia's timber boom appears to have spurred their interest in maintaining their practice of forest resources use. In order to do so, they responded to the issuance of the Basic Forestry Law 5/1967 by granting timber extraction rights within their own networks (Singer, 2009). This move might be indicative of their perceived utility of Indonesian forest, that forest is a source of income stream. The fact that The Great Fires of Borneo were concentrated in previously logged forest might serve as evidence that they were caused by land clearing through burning (Aiken, 2004). Yet, the bureaucrats also considered the fires a natural phenomenon – something that humans had no role in causing. Hence, the interplay of national political and economic situations in combination with their power, practice, interest, cognitive representation of fires, and perceived utility of forest might have led them to accept *wrath*. I suspect that by accepting *wrath*, the bureaucrats intended to help themselves serve their interest over forest resources and maintain their practice in generating revenue amidst a change in power over the Indonesian forest.

Relatedly, *wrath* was well received by international donors. Their action concerning The Great Fires of Borneo could be an indicative of their reception of *wrath*. They provided the Indonesian central government with technical and financial support to control fire within the forest and peatland. For example, the World Bank and ADB assessed environmental damages brought about by the fires and gave the government financial aid to develop fire detection and management systems. FAO provided financial assistance of ~ 2 million USD (~ 4 million USD in today's money) for improving institutional capacity to control fire in Indonesian forest and peatland (Dennis, 1999).

The interplay of national political situation, interest, perceived utility of Indonesian forest and cognitive representation of forest fires appears to have influenced the reception of *wrath* among international donors. The rise of the New Order regime allowed donors to re-establish themselves in Indonesia after previously being banned by the Old Order regime. For instance, when the New Order regime came into power, the central Indonesian government re-joined IMF and the United Nations. Not only did this change enable the government to get foreign aid flowing into the country, but also it allowed the donors to serve their own interest. Such interest may have included generating income from lending money to the government and exercising control on the government. For example, the World Bank provided a loan of ~ 200 million USD (~ 500 billion USD today) for the government to develop the transmigration programme (World Bank, 1985). In addition, the World Bank and IMF developed several guidelines for governmental bureaucratic measures during the early years of the New Order regime (Singer, 2009).

International donors appear to have considered Indonesian forests a means of generating foreign exchange. This cognitive representation of forest utility could be manifested in recommendations they gave to the Indonesian central government with respect to The Great Fires of Borneo. For example, the GTZ (now GIZ) recommended the government utilise the burnt area for timber plantations.[11] Developing timber plantations in burnt area was deemed economically efficient since it did not require heavy land clearing.

International donors' interest and the perceived utility of the Indonesian forest appear to be related to their cognitive representation of Indonesia's forest and peat fires. Their projects with respect to The Great Fires of Borneo were focused largely on mitigating the impacts of El

[11] This recommendation was a result of a study on the impact of The Great Fires of Borneo that the GTZ conducted with support from the International Tropical Timber Organization (ITTO) (see Panzer, 1989, for a review).

Nino and controlling fire.[12] This type of action could indicate that they considered the fires to be a natural disaster. Up to this point, donors appear to have shared the Indonesian central government's interest over forest resources, perceived utility of Indonesian forest and cognitive representation of forest fires. I argue this similarity influenced the reception of *wrath* by donors.

Production

My analysis suggests that agribusiness companies and smallholders recreated *wrath* into *production*. Such a re-creation appears to have been made possible mainly by the Indonesian central government's practice in using forest resources. The transmigration programme and commercial access to forest timber resources enabled smallholders and companies to access *wrath* and interact with fire respectively. Those practices also, to a degree, located these two stakeholders in close proximity to fire.

Agribusiness companies and smallholders shared a similar interest, perceived utility of forest and cognitive representation of Indonesia's forest and peat fires with one another and with the Indonesian central government. All were interested in maximising the source, as they considered the Indonesian forest an important source of income. Companies and smallholders also deemed The Great Fires of Borneo a natural disaster – something beyond human's control.

Close proximity with fire and interest appear to have spurred the practice of land clearing through burning by agribusiness companies and smallholders. An interaction between this practice and their cognitive representation of Indonesia's forest and peat fires appears to have influenced the re-creation of *wrath*. I suggest that ascribing *production* to fire could serve as a justification for their practice in exploiting forest resources by means of fire. *Production* may imply that their practice is rather productive, and uncontrolled fire was not their doing. It is nature's work.

[12] See Hartono & Sato, 1993, for a review.

Tradition

Small-scale farmers live in a spatial context which allows them to directly interact with fire. They live in rural areas within Indonesian forest and peat landscapes. The farmers appear to consider the Indonesian forest part of their life, deeming their practice in using forest resources – subsistence agriculture –environmentally friendly. They typically cultivate food from a small plot of land, and preparing the land, often involves fire. They use fire to remove felled vegetation, destructive weeds and insects. They also believe that burnt organic materials become a natural fertiliser. Such practices have been carried out for many years.

My analysis suggests that small-scale farmers shared similar a cognitive representation of Indonesia's forest and peat fires with other stakeholders. The farmers considered The Great Fires of Borneo a natural disaster, in that long drought made fire spread.

Small-scale farmers' spatial context, practice, perceived utility of Indonesian forest, and cognitive representation of Indonesia's forest and peat fires appear to have influence their interaction with *wrath*. Framing The Great Fires of Borneo was a matter of natural malfunction, living in close proximity with fire and using fire in using forest resource appear to be related to the re-creation of *wrath*. This meaning of fire was reconceptualised as *tradition*. Since fire meant tradition, the farmers appear to have distanced themselves from the fires by believing that their practice had nothing to do with the fires. Hence, they could continue their practice even after the fires wreaked havoc on parts of their agricultural lands.

The Great Indonesian Fires

During the years of 1997-1998, Indonesia observed the recurrence of large-scale fires which devastated the nation and its neighbouring countries. A report from ADB shows that the regional financial consequence was ~ 9 billion USD (more than 22 billion USD in today's currency) which entailed losses in the agriculture and forestry sectors, increased public health

spending, damaged buildings and property, disrupted transportation, led to a sharp decline in tourism, and incurred substantial firefighting costs (Dennis, 1999; Luca Tacconi, 2003). The total burnt area was reported to be ~12 million hectares with a total carbon emission of ~ 3.7 billion metric tonnes (Keenan, 2019; Khadka, 2018). The emission was larger than the annual emission from the European economy and accounted for up to 40% of total global carbon emission in the same period (Fogarty, 2014; Yi, 2016).

My analysis suggests that stakeholders' actions toward the Indonesian forest revolved around the meanings they subscribed to following the previous fires event. Apparently, their actions led to the occurrence of The Great Indonesian Fires. The Indonesian central government continued to convert Indonesian forest areas into development project sites (e.g., transmigration and MRP: Mega Rice Project)[13] and to facilitate the development of timber and cash crop plantations. This practice of using the forest was supported by international donors (e.g., IMF, the World Bank and ADB). The practice also appears to have allowed local bureaucrats, agribusiness companies, smallholders and small-scale farmers to continue their practice in using forest resources. As a result, Indonesia's forest and peat landscapes became further fragmented and eroded – establishing the perfect ecological precursor for extensive fires. Between 1982 and 1998, total forest loss in Indonesia was ~ 23 million hectares (Tsujino et al., 2016). A combination of severe drought during 1997 and 1998, and the practice of clearing land through burning by agribusiness companies, smallholders and small-scale farmers in such landscapes enabled fire to spread.

In the wake of The Great Indonesian Fires, the stakeholders appeared to develop new meanings of fire: *wrath, disturbance, primitiveness*, *social justice*, *production* and *weapon of*

[13] Mega Rice Project was the central Indonesian government's initiative to convert 1 million hectares of peatland forest into a giant rice field. The project was initiated in 1995 through the Presidential Decree No. 82. (Development of One Million Hectares of Peatland for Food Crop Production in the Province of Central Kalimantan, Peat reclamation). The project was also prepared to resettle 350,000 families from the inner islands (i.e., Java, Bali and Madura) (Siegert, Bohm, Siegert, & Muhamad, 1999).

the weak. The emergence of these meanings appears to have been related to change in the national political situation, regional and national economic crises, growing global demand for and national consumption of palm oil products, development and reformation ideology, practice in using forest resources, power, varying interests and cognitive representation of fires. Moreover, the interplay between regional and national economic, and political situations enabled environmental activists to partake in the meaning-making process of fire. To understand the meaning-making process of fire, I develop a cultural diamond of The Great Indonesian Fires (see figure 4).

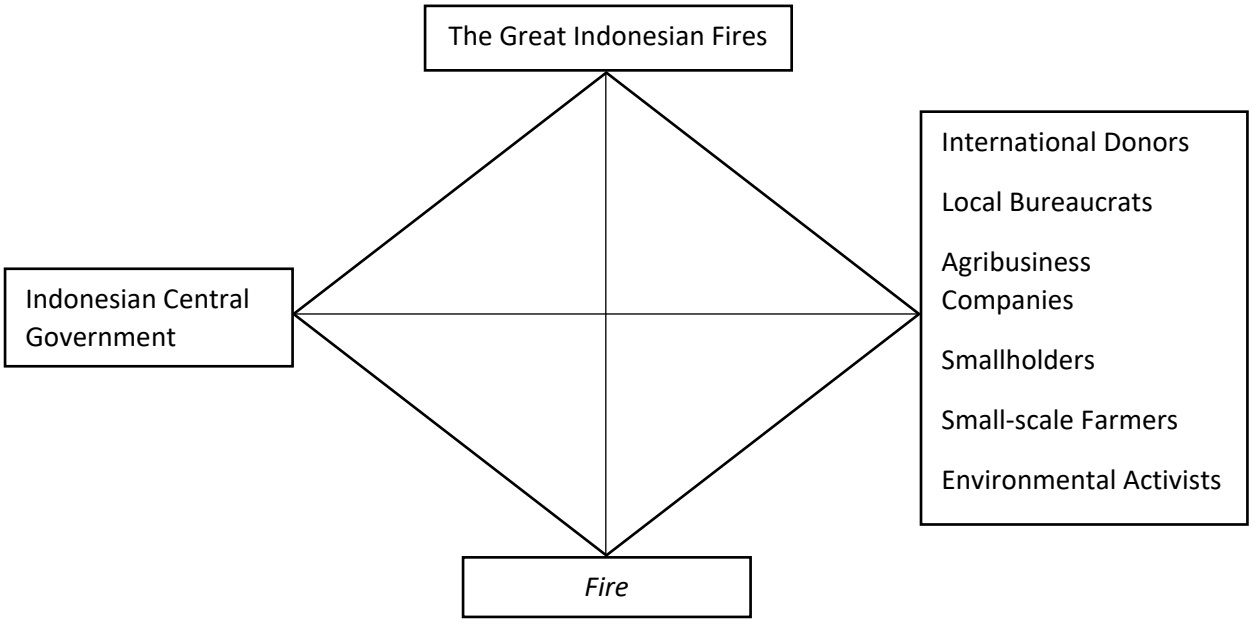

Figure 4. Cultural diamond of The Great Indonesian Fires.

Wrath

Wrath appears to have first emerged within the Indonesian central government. This meaning might be reflected on its initial response to The Great Indonesian Fires that ranged from weather manipulation to create rain to prohibiting national media from mentioning any cause of the fires, except El Nino (Runyan, 1998; *The Economist*, 1997). Further, the

emergence of *wrath* might have been influenced by the interplay between increased global demand for palm oil, and the government's ideology of development, cognitive representation of the fires, power, interest in generating income from forest, and exploitative practice in using forest resources.

A significant increase in global demand for palm oil spurred the central Indonesian government's interest in generating more revenue from the forest through the expansion of palm oil plantations. This interest appears to have been intertwined with the government's ideology of development, to the extent that these two elements somewhat led the government to exert its power to incorporate the expansion of palm oil plantation into the transmigration programme. A Nucleus Estate Smallholder (NES) model was adopted. The participants of transmigration – transmigrants – were given a plot of palm oil plantation in outer islands. Along the same line, the government offered incentives to agribusiness companies to establish palm oil plantations and to build necessary infrastructure. The companies were given access to low interest-rate state loans. In return, they were required to provide the transmigrants with plantations.

The central Indonesian government's ideology of development appears to have motivated it to exercise its power in converting 1.4 million hectares into a gigantic rice field – an initiative known as Mega Rice Project (MRP) (McCarthy, 2013). The project was intended to achieve self-sufficiency in terms of rice production – hence realising the development ideology. The MRP appears also to have been utilised to reinforce Soeharto's positioning as the father of development.

While the implementation of the MRP and the expansion of transmigration and palm oil plantations exacerbated the degradation of forest and peat landscapes, clearing land by means of fire was commonplace. Along this line, Indonesia experienced severe El Nino period in the years of 1997-1998. The degraded landscapes were susceptible to large-scale fires, and

severe drought only intensified the risk. Consequently, the use of fire in the landscapes was dangerous and resulted in escaped and uncontrolled fires that burned considerable proportions of palm oil plantations, and transmigration and MRP sites. Yet, the Indonesian central government appears to have obscured the anthropogenic causes of the fires by treating The Great Indonesian Fires as a natural disaster. This cognitive representation of the fires is also related to *wrath*. The government believed that dry tree leaves rub against one another to spark fire, and the prolonged dry season enabled the fire to become widespread. Hence, fire was deemed the nature's doing. I suggest that by subscribing to *wrath*, the government could deny its role in causing the fires, deflect its responsibility and continue its practice in turning the forest into money-making machine.

Wrath also appears to be salient within international donors. Their subscription to this meaning of fire appears to have been reflected in their actions related to The Great Indonesian Fires. They launched about twenty-six projects aimed at controlling fire and developing an early warning system.[14] Their reception of *wrath* appears to have been influenced by the global demand for palm oil and the regional economic crisis in combination with their power, practice, perceived utility of Indonesian forest, cognitive representation of the fires, and interest in natural resources in the forest.

The Great Indonesian Fires coincided with the Asian regional economic crisis that crippled Indonesia's economy. Indonesian currency lost 70% of its value against the US dollar (Potter & Lee, 1999). Furthermore, these crises occurred when the international market had a great demand for palm oil. The world market price for crude palm oil (CPO) increased dramatically from 520 USD per tonnes in 1997 (~ 824 USD in today's money) to 700 USD in 1998 (~ 1020 USD in today's money) (Potter & Lee, 1999). The price and donors' perceived utility of the Indonesian forest appear to have furthered the donors' interest in generating

[14] See Dennis (1999) for detailed information about the projects.

foreign exchange from the Indonesian forest. For example, IMF included a special clause in its rescue package that required the Indonesian central government to further facilitate expansion of palm oil plantations and to include foreign enterprise in the process. This move from IMF could be an indicative of how the donors exerted power over the government. While the expansion of palm oil plantations was found to be linked to the fires, the donors appear also to have framed the fires as natural disaster. They considered severe and prolonged drought to have led fire to spread uncontrollably. I thus suggest that assigning *wrath* to fire was intended to mask their interest and maintain their practice in reaping benefits from the Indonesian forest.

The Indonesian economic crisis also changed the national political situation. An upsurge in prices of staple food products appears to have undermined local bureaucrats' confidence in the Indonesian central government. A new ideology – reformation – emerged. The local bureaucrats attempted to push a reform in regulation pertaining to forest resource use. They pushed the government to grant them power to issue permits to agribusiness companies for developing palm oil plantations within their administrative boundaries.

Furthermore, this shift of power in controlling forest resources appears to have enabled local bureaucrats to generate revenue from issuing plantation permits to agribusiness companies. Whereas the companies often cleared land by means of fire, the bureaucrats' interest in maintaining their revenue might have prompted them to receive *wrath*.

Disturbance

The Indonesian central government received serious pressure from the international community to put out the fires of The Indonesian Great Fires. The pressure came especially from the Singaporean and Malaysian governments as toxic haze blanketed the two nations. The complaints prompted the government to recognise an anthropogenic ignition source, and it began to prohibit land clearing by means of fire. The government blamed slash-and-burn agriculture for causing the fires. Hence, the government recreated *wrath* to *disturbance*.

In similar fashion, international donors appear to have adopted *disturbance*. For example, ADB and GTZ claimed that The Great Indonesian Fires were a result of "careless" use of fire for livelihood and settling land tenure conflicts by small-scale farmers. Moreover, the emergence of *disturbance* among the donors and the Indonesian central government appears to have been shaped by their shared interest in generating income streams from the forest and similar cognitive representation of the fires.

Primitiveness

Primitiveness situates fire as a primitive tool for clearing land. This meaning of fire appears to have emerged among the Indonesian central government and international donors. The spatial context, practice and interest that they shared with the government's ideology of development might be the reasons behind the re-creation of *disturbance* into *primitiveness*.

The Indonesian central government's ideology of development stimulated capitalisation and commodification of forest resources through an extensive means of "modern" production. The government deemed the slash-and-burn practice of small-scale farmers materially and culturally backwards, and in need of further economic and cultural improvement. The practice of slash-and-burn appears to have been associated with the failure to embrace modern agriculture techniques by the farmers. Hence, land clearing by means of fire was deemed a primitive practice.

Furthermore, living in the capital city of Indonesia, Jakarta, central government officials were far away from fire. They might fail to understand the importance of fire for small-scale farmers in realising their subsistence and tradition. The government's spatial context combined with its interest and practice in exploiting forest resources appear to have also contributed to the emergence of *primitiveness*. Arguably, this meaning of fire was intended to mask and deflect attention away from the real cause of The Great Indonesian Fires.

Similar spatial context, interest and practice appear also to have contributed to the adoption of *primitiveness* by international donors. While distance matters, the economic prospect from aiding the Indonesian central government in extracting forest resources might have influenced their reception of *primitiveness*. By subscribing to this meaning of fire, they could associate fire with the problems of poverty and development. By this, I mean that they could locate blame within a "poor" population that needed to degrade their environment for survival. Thus, deeming slash-and-burn primitive could somewhat help the donors in maintaining their "support" for the government's position that massive mechanisation of forest resources was necessary to alleviate poverty and help Indonesia to develop.

Production

The Indonesian central government's ideology, practice in using forest resources and in ruling Indonesia appear to have enabled agribusiness companies and smallholders to recreate *wrath* and *primitiveness* into *production*. For example, the development of MRP involved the New Order's allies and cronies. Well-connected companies were appointed as the project partners. The companies were even given subsidies to access otherwise inaccessible peat swamp rich in timber. Since the government considered fire in terms of *wrath* and *primitiveness*, the companies could practice the primitive means of clearing land under the shadow of the government's ideology of development. They considered fires an efficient means to conduct massive extraction of peat swamp timber. Clearing land by means of fire appears to have cost the companies only ~ 180 USD per hectare (~ 300 USD in today's currency) whereas mechanical clearing without burning was ~ 817 USD per hectare (~ 1,000 USD in today's money).[15]

Whereas the transmigration programme placed smallholders in close proximity to fire, their previous experience in clearing land through burning appears to have contributed to their

[15] See Guyon and Simorangkir (2002) for detailed calculation.

re-creation of *wrath* into *production*. Furthermore, the NES initiative might also have influenced the re-creation. Fire was deemed cheap and efficient in preparing palm oil plantations. For example, the cost of clearing land through burning was ~ 156 USD per hectare (~ 250 USD in today' money) while clearing land without burning was ~ 225 USD per hectare (~ 356 USD in today's currency).[16]

Weapon of the Weak

The practice of using forest resources by the Indonesian central government and agribusiness companies often came with little regard for small-scale farmers. The government used its power to enact its claim of ownership over forest areas that resulted in a revocation of small-scale farmer's rights over land within forest and peat landscapes. In the same vein, the companies often denied the rights of local farmers who already lived on the land where the companies planned to establish palm oil plantations. In response, the farmers appear to have become arsonists in the sense that they used fire to reclaim their land. They often deliberately burned the companies' plantations. Hence, *weapon of the weak* emerged.

Social Justice

The regional and economic crises eventually forced General Soeharto to step down in 1998 – ending the New Order regime. A new political situation marked by the collapse of the regime somewhat became a fertile ground for activism. This situation enabled environmental activists to interact with and recreate meanings of fire. As they interacted with *wrath, disturbance* and *production*, they could use their power to mobilise resources for conducting investigations into the cause of The Great Indonesian Fires. Their findings indicate that the use of fire by agribusiness companies should have been held responsible for causing the fires.[17] Their perceived utility of Indonesian forest, as life support, and their findings appear to have

[16] See Suyanto et al (2004) for detailed calculation.

[17] For example, a report from WWF suggests that land clearing through burning by palm oil companies resulted in a widespread fires within their concessions which then escaped their plantations (Potter & Lee, 1999).

motivated them to mobilise resources to bring legal action against the companies.[18] At the same time, they advocated for the practice of slash-and-burn by small-scale farmers. They believed that the use of fire by the companies was environmentally irresponsible, while land clearing through burning by the farmers was important for the farmers' subsistence. Hence, *social justice* emerged.

The 2015 Mega-fires

The 2015 mega-fires resulted in extensive burdens ranging from a local reduced quality of life to the transboundary issues of toxic haze and associated economic loss (Edwards & Heiduk, 2015; Lin, Wijedasa, & Chisholm, 2017). The fires also released ~ 1.5 billion tonnes of carbon emissions, exceeding the daily average emission of the entire United States for the same period (Van der Werf, 2015). The emission generated serious concern related to the disproportionate contribution to global environmental change (Luca Tacconi, 2016).

In the wake of the 2015 mega-fires some meanings of fire appear to have remained stable while others changed. The meanings became: *disturbance*, *relational token*, *social justice* and *weapon of the weak*. The emergence of this variation appears to have been tailored to the growth in global demand for palm oil products, national political situation, spatial context, power, cognitive representation of Indonesia's forest and peat fires, and perceived utility of the Indonesian forest. In particular, a more democratic political situation enabled the stakeholders to create and recreate the meanings of fire. To further understand the position of the stakeholders, I develop a cultural diamond of the 2015 mega-fires as presented in figure 5.

[18] For example, WALHI (Indonesian Forum on the Environment) brought a legal suit against eleven palm oil companies, two of which were found guilty for allowing the use of fire in their plantations (Suara Pembaruan, 1998).

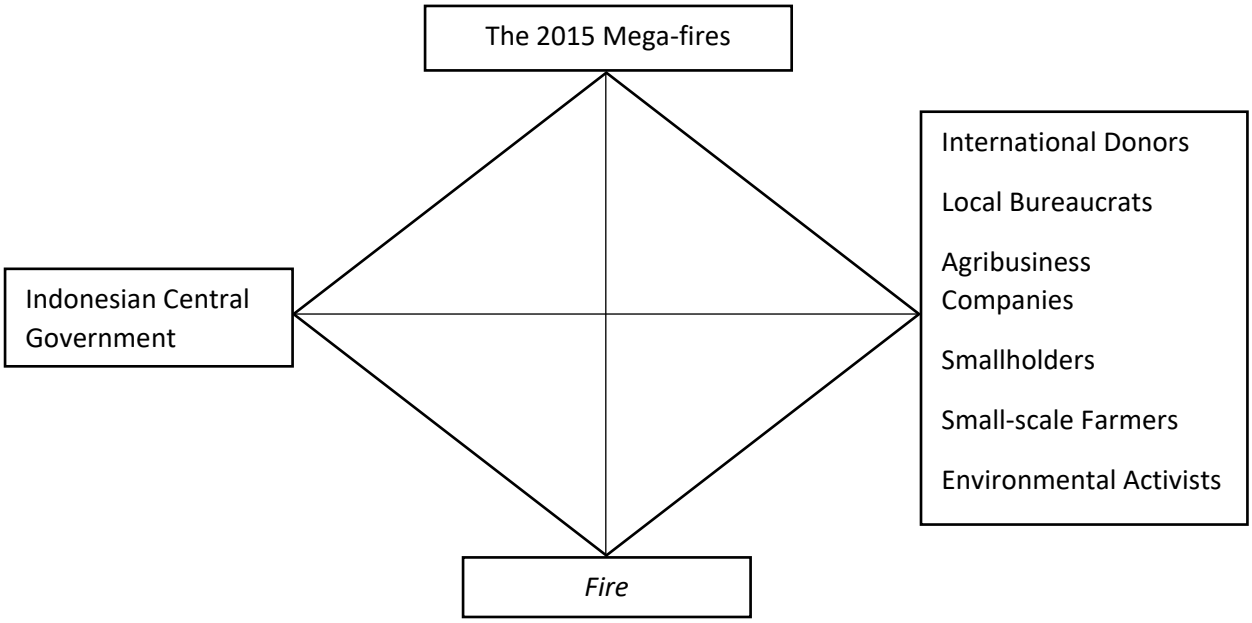

Figure 5. Cultural diamond of The 2015 Mega-fires.

Disturbance

In response to the magnitude of the 2015 mega-fires and pressure from international community, including consumers of palm oil, the Indonesian central government issued a blanket ban on clearing land through burning[19] –reflecting *disturbance*. The ban is aimed at prohibiting practices of clearing all land through burning and it imposes fines or arrest of offenders. The government extended the implementation of the ban to local bureaucrats. Failure to control and prevent fires within their jurisdiction would result in demotion or dismissal.

The Indonesian central government's cognitive representation of the 2015 mega-fires and perceived utility of the Indonesian forest appear also to have influenced the creation of *disturbance*. The government considered the use of fire for land clearing as the main cause of the fires. It also deemed the forest important for national efforts in mitigating the brunt impacts

[19] The ban was stipulated in Presidential Instruction 11/2015 regarding Increased Control of the Burning of Forests and Lands.

of global climate change. Hence, the forest needed to be conserved and clearing land through burning must not take place in the forest.

Disturbance appears to have been received by international donors. They considered clearing land through burning environmentally destructive. Hence, an alternative to fire must be introduced. Consequently, the donors supported the Indonesian central government's effort in conserving the Indonesian forest. They even established a special funding source for the government, namely the Sustainable Landscape Management Multi Donor Trust Fund (SLM-MDTF).

Pressure from international market and from the Indonesian central government on agribusiness companies in combination with the companies' interest appear to have motivated the companies to adopt *disturbance*. The market demanded them to realise a more sustainable practice in cultivating palm oil. At the same time, the companies bore a significant economic consequence of the 2015 mega-fires as a considerable proportion of their plantations were burnt. As a result, they deemed clearing land through burning destructive. However, they blamed small-scale farmers for setting fire near the companies' plantations. Consequently, they developed a community-based fire intervention for small-scale farming communities residing near their plantations.

Relational Token

Relational token refers to the use of fire as a tool to maintain a stakeholder's relationship with other stakeholders. This meaning of fire was particularly salient among local bureaucrats. Pressure from the Indonesian central government and their shared spatial context with small-scale farmers appear to have motivated the bureaucrats to recreate *disturbance* into *relational token*. While the pressure forced them to show success in controlling and preventing fires, their close proximity with small-scale farmers has spurred social dependencies.

Production

The re-creation of *disturbance* into *production* appears to be salient within smallholders. Living in close proximity to fire, the smallholders have had the opportunity to maintain their practice in clearing land through burning. This spatial context perhaps has allowed them to cultivate immediate benefits from using fire when preparing agricultural plantations.

Although the ban may expose them to legal consequence, it did not come with alternative to fire and its implementation rather weak. The absence of alternative to fire and poor policy implementation might permitted the smallholders to continue their practice in clearing land by means of fire.

Additionally, while Indonesia has experienced palm oil boom, the smallholders have only received limited economic benefits. Despite majority of palm oil supply comes from their plantations, they appear to have limited power in setting the price of fresh fruit bunches. The price has been dictated by agribusiness companies operating nearby. This condition is rooted in the early development of palm oil plantation. The smallholders were only given a plot of palm oil plantation lands while the companies built the mill, and necessary infrastructure and technology to convert the fresh fruit bunches to CPO. Thus, the smallholders' income from selling the fruit bunches might not exceed an offset of increased cost for maintaining their palm oil plantations – due to inflation and other factors. This could also be the reason behind the (re)creation of *production*, that fire could be the most economical means of land clearing through they can keep production cost low.

Weapon of the Weak

Weapon of the weak appears to stay salient within small-scale farmers. This could be the re-creation of *disturbance*. Living in close proximity with fire has enabled them to maintain their practice in realising fire-based agriculture. Fire has been deemed critical for improving soil fertility. The farmers believed that without burning their land may fail to produce rice. While they were concerned on their food provision, the might be punished for continuing their slash-and-burn practice. Yet, their interest in surviving might outweigh their fear. While this could underlie their continued practice in clearing land through burning amidst the ban, the use of fire might be a means for protesting the central Indonesian government as the ban did not come with attainable alternative to fire – hence the (re)creation of *weapon of the weak*.

Social Justice

Conservation ideology and activism practice might be the primary reasons for environmental activists to recreate *disturbance* into *social justice*. Environmental activists have been vocal in voicing concern on the welfare of the nature. They deemed Indonesian forest critical for supporting the life of the many. Additionally, they appear to believe that small-scale farming community consists of traditional farmers whose subsistence practice has been environmentally friendly. Since fire was deemed crucial for the subsistence, preventing them from realising the subsistence was considered unjust.

PROVISIONAL CONCLUSION

This study attempts to elucidate the emergence of different meanings of fire during three fires events. Drawing on cultural theory, I argue that the meanings are shaped by varying interests, contexts, ground memberships and conceptions of Indonesia's forest and peat fires. Findings of this study suggest that the meanings were influenced by nine elements: national political situation, spatial context, and global, regional, national economic situations, perceived

utility of the Indonesian forest, cognitive representations of Indonesia's forest and peat fires, power, interest, ideology and practice. The interplay of these elements appear to have shaped and reshaped the meanings over time. While the interplay might illustrate meaning-making process, the use of secondary data might have restricted my attempt to capture the actual process through the view point of the actual actors. Thus, further research is necessary to explain meaning-action linkage and the role of the elements in shaping the process underlying meaning-making process of fire amongst the stakeholders.

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